

**CLAIMS**

1. A preparation of an isolated mammalian serine racemase having a specific activity of at least 0.003  $\mu$ mole L-serine/mg/hour.
2. The preparation of claim 1 wherein the specific activity is at least 0.025  $\mu$ mole L-serine/mg/hour.
3. The preparation of claim 1 wherein the specific activity is at least 0.075  $\mu$ mole L-serine/mg/hour.
4. The preparation of claim 1 wherein the specific activity is at least 1  $\mu$ mole L-serine/mg/hour.
5. The preparation of claim 1 wherein the specific activity is at least 2.5  $\mu$ mole L-serine/mg/hour.
6. The preparation of claim 1 wherein the specific activity is at least 5  $\mu$ mole L-serine/mg/hour.
7. The preparation of claim 1 wherein the racemase has an amino acid sequence as shown in SEQ ID NO: 8. *murine*
8. The preparation of claim 1 wherein the racemase has an amino acid sequence as shown in SEQ ID NO: 10. *human*
9. The preparation of claim 1 wherein the racemase is murine.
10. The preparation of claim 1 wherein the racemase is rat.
11. The preparation of claim 1 wherein the racemase is human.
12. The preparation of claim 1 wherein the racemase comprises an amino acid sequence as shown in SEQ ID NO: ~~6~~ *8 or 10* 8, or 10.
13. A preparation of an isolated mammalian serine racemase having a specific activity of at least 0.003  $\mu$ mole L-serine/mg/hour wherein the racemase has a sequence selected from the group consisting of SEQ ID NO: 8, SEQ ID NO: 10, and sequences which are at least 85% identical to SEQ ID NOS: 8 or 10 as determined according to the Smith-Waterman homology search algorithm, using an affine gap search with gap open penalty of 12 and a gap extension penalty of 1.
14. An isolated and purified polynucleotide molecule which encodes a mammalian serine racemase.
15. The polynucleotide molecule of claim 14 consisting of a coding sequence for

mammalian serine racemase.

16. The polynucleotide molecule of claim 14 comprising a nucleotide sequence as shown in SEQ ID NO: 1. *murine*
17. The polynucleotide molecule of claim 14 comprising a nucleotide sequence as shown in SEQ ID NO: 2. *y*
18. The polynucleotide molecule of claim 14 comprising a nucleotide sequence as shown in SEQ ID NO: 3. *partial human*
19. The polynucleotide molecule of claim 14 comprising a nucleotide sequence as shown in SEQ ID NO: 9. *human*
20. An isolated and purified polynucleotide molecule which encodes a mammalian serine racemase which is at least 85% identical a polynucleotide having a coding sequence as shown in SEQ ID NOS: 1, 2, 3, or 9 as determined according to the Smith-Waterman homology search algorithm, using an affine gap search with gap open penalty of 12 and a gap extension penalty of 1.
21. An expression vector comprising a polynucleotide molecule according to claim 14.
22. An expression vector comprising a polynucleotide molecule according to claim 19.
23. An expression vector comprising a polynucleotide molecule according to claim 20.
24. A host cell comprising an expression construct which comprises a polynucleotide sequence encoding a mammalian serine racemase.
25. A host cell comprising an expression construct which comprises a polynucleotide sequence as shown in SEQ ID NO: 1.
26. A host cell comprising an expression construct which comprises a polynucleotide sequence as shown in SEQ ID NO: 9.
27. A host cell comprising an expression construct which comprises a polynucleotide according to claim 20.
28. A method of producing a mammalian serine racemase comprising the steps of:
  - culturing a host cell according to claim 24 in a culture medium;
  - recovering a mammalian serine racemase from the culture medium or the host cell.

29. A method of producing a mammalian serine racemase comprising the steps of:
- culturing a host cell according to claim 25 in a culture medium;  
recovering a mammalian serine racemase from the culture medium or  
5 the host cell.
30. A method of producing a mammalian serine racemase comprising the steps of:
- culturing a host cell according to claim 26 in a culture medium;  
recovering a mammalian serine racemase from the culture medium or  
10 the host cell.
31. A method of producing a mammalian serine racemase comprising the steps of:
- culturing a host cell according to claim 27 in a culture medium;  
recovering a mammalian serine racemase from the culture medium or  
15 the host cell.
32. A method to screen compounds to identify candidate therapeutic agents comprising the steps of:
- contacting a test compound with a mammalian serine racemase;  
assaying activity of the mammalian serine racemase;  
20 identifying a test compound as a candidate therapeutic agent if it modulates the activity of the mammalian serine racemase.
33. The method of claim 32 wherein the candidate therapeutic agent inhibits the activity of the mammalian serine racemase.
34. The method of claim 32 wherein the candidate therapeutic agent increases the  
25 activity of the mammalian serine racemase.
35. The method of claim 32 wherein the mammalian serine racemase is murine.
36. The method of claim 32 wherein the mammalian serine racemase is rat.
37. The method of claim 32 wherein the mammalian serine racemase is human.
38. The method of claim 32 wherein the mammalian serine racemase has a  
30 specific activity of at least 0.003  $\mu$ mole L-serine/mg/hour.